The chief difference as regards scope is that in my course elementary integral calculus replaces the more advanced parts of trigonometry, college algebra and analytics in his. It should be remembered that we carefully avoid problems in which the details are very complicated; and that we introduce the calculus gradually, returning to it again and again during the year, and thus driving it home with a minimum of difficulty; also, that elementary integral calculus is much easier for the average student to understand than the more advanced and abstract parts of trigonometric analysis, such as the general treatment of imaginaries and vectors, progressive waves, the solution of cubics, etc., or the study of higher plane curves, hyperbolic functions, etc. The fact is that my course formerly included more of these topics and less integral calculus, and was noticeably more difficult then. Consequently, I am unable to conceive how his course could succeed in any institution where mine would fail.

Indeed I do not understand why anyone should expect my course to fail with the class of students found in our state universities. After having taught the course five years to students whose preparation has varied all the way from a year of algebra and a term of geometry to four years of mathematics, I should expect the course to succeed almost anywhere with good teaching. Our students work well, but their *preparation* is in no way unusual. Their knowledge of the technique of algebra and the facts of geometry is decidedly defective.

(2) *As to the importance of including integral calculus.* It ought to be possible for prospective workers in physical chemistry, biology, statistics, or economics to get in one year the mathematical equipment which they need, including some understanding of the elementary applications of integration. If any university is not interested in providing such equipment (supposing this to be feasible), so much the worse for that university. Moreover, for physicists, integral calculus is many times as useful as differential. Again, the student specializing in mathematics should become familiar with both branches of the calculus as early as possible. Also "the non-specialist who wishes an introduction to mathematics" should by all means see something of integral calculus. The inclusion of this subject tends decidedly to unify the whole, and to give the student a "knowledge of calculus" that will really "compensate" him for the omission of other topics. Why allow the complex variable, and the witch, cissoid, conchoid, and polar equations of conics to shut out the most valuable part of the course?

(3) Finally, my statement that "the more theoretical parts of college algebra and analytics are postponed to the junior year" seems to have been misleading. The analytics as a whole is not postponed, but only the study of the more intricate parts. All the usual type equations are covered—in fact, all the plane analytics needed for the usual work in calculus.

Relating to the Slope-angle of a Curve.

By H. B. Phillips, Massachusetts Institute of Technology.

The recent review of my analytic geometry by Dr. G. R. Clements contains a rather severe criticism of my use of the angle φ from the x-axis to a line. If I

had not thought the matter over so carefully, I should heartily endorse his criticism.

The angle φ as I use it is not "the least positive angle" but any angle, positive or negative, from the positive direction of the x-axis to the line. Precisely which angle is to be represented by φ in a particular case, is determined by convenience. The tangent formulæ are correct for all.

My reason for this is to avoid the discontinuity that otherwise occurs. According to the "least positive angle" definition a line with a small positive slope makes with the x-axis a small angle while a line with a small negative slope makes an angle near 180°. This leads to trouble when an angle passes through zero. For example, the curvature is usually defined as $d\varphi/ds$. I do not know of any calculus text where this formula is considered inexact at points where $\varphi = 0$. Yet that is the case if φ is the least positive angle.

In defining angles, several cases are to be considered. In determining a directed line, angles congruent, modulo 2π, are equivalent. In determining merely the position of a line, angles congruent, modulo π, are equivalent. In three dimensions there is often no distinction between positive and negative angles. In each of these cases it is not only unnecessary but actually inconvenient to fix the angle more precisely.

OFFICIAL ANNOUNCEMENTS OF THE COUNCIL.

During the past three months, the Council has taken official action on pressing matters which seemed to require immediate action. In general, the members of the Association will be informed of pending actions in order that their opinions may reach the Council before decisions are made. These questions did not appear to be of that kind.

The actions submitted by mail and approved thus far are as follows:

(1) The Council authorized the election to membership of all those who signed the original Call for the Columbus meeting, and of those who participated in that meeting.

(2) The Council authorized the Secretary to allow a few days, not to exceed ten days, of grace for mail to reach him after April 1st, so that those desiring to enter as charter members should not be excluded by accident or by unavoidable delay.

(3) The Council ordered that the books and magazines belonging to the Association be deposited in the Oberlin College Library, under direct charge of the Secretary of the Association and the Librarian of Oberlin College. It is understood that these books are to be kept in a separate and safe place, and that they are to be subject to withdrawals and to requests from members for temporary loan, subject to the further wishes of the Association. See also (7) below.

(4) The Council ordered that a summer meeting be held near the time of the summer meeting of the American Mathematical Society, in the buildings